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WEITERE INFORMATIONEN OK

Saturday, August 22, 2009

Praying to Gliese 581d

COSMOS magazine of Australia is teaming up with the Australian national government and the Jet Propulsion Laboratory (JPL) and NASA in the United States to send a ream of messages gathered from the public via the JPL-run Deep Space Network (on which I once worked) to the nearby star system of Gliese 581, which includes the recently discovered extrasolar planet Gliese 581d. The schedule is to send the messages on Friday, August 28th. According to COSMOS's editor, Wilson da Silva,

> Yes, it is a "stunt": the purpose is to engage the public during Science Week in Australia and get them thinking about the big questions: are we alone, is life common in the universe, how often does intelligent life arise, how big is space, etc etc.

It will apparently also be good for COSMOS' advertising and subscription revenue:

> So far, it has been very successful: more than 1,000 newspapers and other media have published online stories all over the world, it has been featured on 9,000 blogs and more than 1.17 million pages of the site have been read in the past 10 days.

I can't say whether it will hurt or harm the quests of the government agencies and contractors involved for more taxpayer money.

Alas, this admitted publicity stunt gets the public thinking about "the big questions" in a way that is rather prejudiced about the answers. The very act of sending a message to a specific star suggests to our newly attracted pupils that there is some substantial probability of extraterrestrial intelligence (ETI) at the other end, when astronomers have observed over 10 billion galaxies and have never seen any signs of ETI. The odds of even one other ETI civilization in our galaxy, much less specifically around one of the two hundred billion stars in our galaxy, Gliese 581, are rather remote. Just how remote we will now explore -- then we shall take a look at the prayers to Gliese 581d.

The mindset at work with the COSMOS transmission is similar to those behind the web calculator Drake Equations that I've seen. The Drake Equation supposedly brings together all the main probabilities relevant to calculating how many ETI we might expect to find in our galaxy: the expected number of habitable planets, the probability of the origin of life given a habitable planet, the probability of intelligence evolving given life, and so on. You are supposed to be able to input your own assumptions into these calculators and it spits out the expected number of ETI in our galaxy based on these assumptions. Real scientists actually observe the universe and fit their equations and parameters to what they see, rather than what they wish were true, but these "science education" sites invite the visitor to plug in what they wish -- unless it doesn't fit what the web site authors wish.

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About Me

Nick Szabo

"A premier thinker about history, law and economics, and the lessons they have for security." -- Adam Shostack, Emergent Chaos

"Szabo comes out with these essays that leave me in awe." -- Brian Dunbar

"Reading material that is eclectic, challenging and endlessly fascinating." -- Sean McGrath, Propylon

"Like most blogs worth my attention, this blog is updated only infrequently. That is because the authors of blogs worth my attention only post when they have something to say that is true, relevant and not already known by their audience. Most of the human race does not have the skill to know when an idea has these three properties. The skill is particularly rare in the fields of politics and economics, which is why this blog is such a rare and valuable thing." -- Richard Hollerith

View my complete profile

From these sites we learn something very interesting, not about how science should be done or what it has observed, but about the hopes and wishes of their authors. These calculators don't allow just any numbers to be placed in them, but only numbers within a range defined by the authors. They don't even allow numbers to be placed into them that are most consistent with what astronomers have actually observed in the universe, i.e. the ubiquitous naturalness and lack of artificiality everywhere they look. Let's use as an example the least pathological.

A reasonable guess, given the improbability of actually existential threats between the invention of printing (with the permanence it brings to civilization) and the end of the universe, is that most casually connected series of civilizations will achieve a substantially >1 billion years lifetime. (In other words, while many civilizations might rise and fall, and subsequent intelligent species might even replace prior ones, once a civilization achieves printing this causal chain of civilizations is unlikely to be permanently terminated, and will probably move beyond the home planet and within a few tens of millions of years spread across its home galaxy). The largest value this calculator allows for average civilization lifetime is 1 billion years, but even putting in this too small value makes it impossible to put in at least one other value consistent with our observations. (Update: since I wrote this section on the Drake calculator for a private list a few months ago, they've updated the calculator and it now supports lifetimes up to 5 billion years, but the other limitations remain).

Astronomers have looked far and wide in the skies, builders and miners and geologists and archaeologists have dug and examined millions of places on our own planet, and have seen neither any alien civilization, nor even their remains, on or near our planet or anywhere in our galaxy. They would likely have long since spread across our galaxy by now, a process that would take only a few tens of millions of years. They would have blotted out the stars to keep their energy from going to waste. Our observations of other galaxies -- with extremely few galaxies deeply moved into the infrared consistent with a space-faring civilization efficiently harvesting the energy of its stars -- strongly suggest that the number of civilizations is far less than 1 per galaxy. The naturally rare molecules used in the artificial surfaces of these massive constructions would also stand out in spectra against the naturally common molecules in dust clouds, planetary nebulae, etc. that astronomers actually observe.

But even sticking with the order of magnitude of between 0.1 and 1 per galaxy, this "model" does not allow the input of values consistent with both this order of magnitude and with what we observe about life on our own planet.

One has to put the minimum allowed for both the fraction of habitable planets with life the fraction of inhabited planets that achieve intelligent life to achieve this order of magnitude. Based on the commonality of near-intelligence life on our planet the latter number is probably much higher than the minimum allowed value 1/10^6. Based on the extremely improbable genetic complexity of even the simplest known self-sufficient microbial ecosystem, the former number is probably much lower than 1/10^6. But the program prevents input of these kinds of values most consistent with our observations.

Other Drake calculators I have looked at are far worse still in not allowing the most reasonable values to be placed into the Drake Equation. They are not teaching science -- numerology, or here we might call it Bayesiology, is not science -- they are selling a belief, the belief that our galaxy is filled with morally advanced beings that we can talk to. How are these grossly misleading "educational tools" and publicity stunts like COSMOS helpful in teaching the questions of "are we alone, is life common in the universe, how often does intelligent life arise, how big is space, etc."?

~~COSMOS~~ An Enid News & Eagle piece republished by COSMOS invokes another prejudiced cliche of the SETI (Search for ETI) crowd: ETI living in a heavenly utopia:

> Me [Human interviewer]: "... So you don't elect leaders?
> Then who keeps you safe?"

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Bleem: “From what?”

Me: “From criminals, from other countries that declare war on you.”

Bleem: “Explain criminals.”

Me: “People who steal other people’s things or hurt them. Some even kill other people.”

Bleem: “Explain steal.”

Me: “Taking things that don’t belong to you.”

Bleem: “Explain kill.”

Me: “To terminate one’s existence.”

This nonsense neatly avoids an important question Drs. Jared Diamond and David Brin have raised -- if, per COSMOS' assumption that ETI is common, these creatures, likely far more ancient and powerful than humans, do receive our message and thereby discover us, may that not put humanity in severe danger? Instead of "shouting at the cosmos", shouldn't we put reasonable restrictions on the power, focus, and targets of transmissions until we learn whether and what kinds of threats might exist? (I realize Gliese 581 probably doesn't raise this issue, because being within about 20 light-years they would probably have already detected our oxygen spectra, our "I Love Lucy" and "Seinfeld" broadcasts, our nuclear tests, and much else, but the [update: COSMOS' own, as well as the EN&E's] article[s], supposedly an exercise in education, doesn't even raise the issue and explain this).

By blithely ignoring this issue while it sends the messages, COSMOS again answers the question with extreme prejudice by assuming it is safe. They even have a theological justification: ETI wouldn't harm a flea, because the only thing these innocents can understand is their seraphic utopia. Apparently no living thing up there in the heavens eats any other living thing -- our ETI are puzzled by the very concept of "kill". Our beatific interlocutors were apparently created by an onmniscient and omnibenevolent god to dwell together in heavenly communal bliss rather than evolved through Darwinian evolution. Children of Australia, there's your biology lesson for the day.

COSMOS has rejected "inappropriate" messages to Gliese 581d, but it does not describe what its criteria for "inappropriate" might be. How can any of us humans predict the reaction to any given message of a genetically completed unrelated creature, even assuming it exists, in a culture about which we know absolutely nothing? COSMOS has no basis for deciding that any stupid or insulting message, and there are plenty of stupid and insulting messages that they let through, is better than any other, besides their own particular human 21st century Australian reactions.

Many submitters are sending normal chatty messages, while some are quite properly treating the whole thing as a joke, but it is worth thinking abut how closely many of the messages in this "science" project resemble prayers (all errors in the original):

"I hope when you recieve these messages that you will come and visit and bring a new age to the human race. LIVE LONG AND PROSPER."

"All things work together for good."

"We're live in one universe,so we just like a family.We can share our happy with you."

"We are so small."

"Please help us to stop the obesity problem that haunts our world!"

"Please come visit us on Earth as soon as you can.We've been waiting a long time to see you.Don't make us wait any longer! LIVE LONG & PROSPER!!!"

"I know we are not alone.You are watching us."

"Don't let humans colonize habitable extrasolar planets, contact us before then please. Thanks for not colonizing Earth long ago and allowing humans to evolve."

"Bring some peace to the earth."

"I am told if you say something to the universe it may come true."

"We know that we are not alone,hope to hear from you."

"Your technologies must be advanced than humans by millons of years.let us share all good things and we shall be friends."

"Hello God, are you there?"

And that's just from the first page of messages. These interstellar tweets that COSMOS collected and NASA obligingly plans to send via its Deep Space Network to Gliese 581, the earlier "Teen Message" sent by Dr. Alexander Zaitsev and his team from the Evpatoria dish in the Ukraine, and the Drake calculators that invite you to believe that your wishes are scientifically true, unless they disagree with the authors', are exercises, not in science education, but in "educating" the public in the tenets of an often twisted faith.

Posted by Nick Szabo at 11:37 PM

24 comments:

Selma von Hayek said...

Reading those messages was a riot, but I stopped laughing when I realized that some of those people are really creepy.

11:21 AM

Anonymous said...

Any sufficiently advanced civilization will use all available spectra for their own communication needs - which means as they approach the Shannon Limit their signals will be indistinguishable from noise to an outside observer. You can see this happening already with some of our newer spread spectrum radio technologies. This means there's only about a 200 year window in a civilization where electromagnetic signals will be detectable. Plug that into your Drake equation...

11:18 PM

nick said...

Anonymous, communications are not the only, or even main way to learn about the existence of a culture. (Notice that I didn't even mention SETI's failure to find radio signals as evidence). Surface engineering follows a very different trend -- the better engineered surfaces are (and optical properties are typically the most important surface properties), the more unnatural they look.

2:19 AM

Mitchell said...

"A reasonable guess, given the improbability of actually existential threats between the invention of printing (with the permanence it brings to civilization) and the end of the universe, is that most casually connected series of civilizations will achieve a substantially >1 billion years lifetime."

!?

I guess expressing incredulity gets me nowhere, it just means my priors are different to yours. But consider this: it takes just one civilization in a chain of them to choose death as the universal good, and it will utilize all its resources to ensure that there is *no* successor civilization.

One billion years is a really long time.

3:44 AM

nick said...

"it takes just one civilization in a chain of them to choose death as the universal good."

The causal chain is parallel as well as sequential. Under what circumstances and during what eras can one civilization destroy their peers? I believe this is very rare. (And keep in mind I'm talking about existential threats to the whole set of parallel civilizations here, not mere disasters, so that for example nuclear war, 10.0 earthquakes on only one part of the planet, and so on don't qualify).

12:29 PM

nick said...

BTW, it's not a matter of intuition, it's a matter of thinking carefully about existential threats: not how many get killed, but how many survive, and how they do so. Most peoples' intuition doesn't distinguish between major disasters and existential threats. The confusion of harm and horror with existential threat creates severe fallacies when people think about existential threats.

12:36 PM

nick said...

Ack, haste makes waste.

"Under what circumstances and during what eras can one civilization destroy their peers?'

should read, "Under what circumstances and during what eras can one civilization destroy its peers and itself beyond probable future recovery?"

"not how many get killed, but how many survive, and how they do so.'

should read, "not who gets killed, but who survives, and how they do so." Number is only one of many important things to think about.

1:56 PM

Anonymous said...

Nick: I think you should be a bit more honest and contextualise the extracts you've taken: both of my comments and from the COSMOS site.

1.You say "COSMOS invokes another prejudiced cliche of the SETI ... living in a heavenly utopia". You then proceed to quote - not from anything we at COSMOS have said - but a lighthearted opinion column from The Enid News & Eagle. This was reproduced in the "Media Coverage" page of COSMOS, and clearly identidies the source as The Enid News & Eagle. It does not represent the thinking of COSMOS or the people behind the project. This is the kind of error for which a reporter would get fired.

2. To say "It will apparently also be good for COSMOS' advertising and subscription revenue", and then cite a quote from me that is completely unrelated, suggests that a) I was discussing advertising and subscription revenue when I made the comment that follows (not true); and/or that b) I endorse such a reading of the quotation (not true). A reporter would get a warning for drawing such a lopsided inference.

3. The "Yes, it is a 'stunt' .." comment I made was in a response to commentary on a SETI email discusison list about the Hello From Earth project. You did not explain this context, nor did you seek to draw a difference between the audience and topics being addressed in that comment or the comment you later quoted (which was to the media and deal with the general success of the site). That's ungentlemanly at best.

I think the points you make can stand on their own without being mischievous in how you quote me or COSMOS. I agree wholeheartedly that there are issues to be discussed in the debate about whether or not to intentionally transmit signals. It is a debate I did not know existed before we ventured into this project, nor did I realise how heated it has been and contibues to be.

But I don't it does the debate any service by quoting one side or another selectively and without context.

Regards,

Wilson da Silva
Editor of COSMOS, creator of HELLO FROM EARTH

9:52 PM

nick said...

Wilson, thank you for your comments. My responses:

#1. "COSMOS" is in very large font, the dominant lettering on the page, and "Enid News & Eagle" in very small font -- I failed to recognize the latter. Thank you for the clarification. It remains a hilarious example of the preposterous utopianism of many in the aliens-we-can-talk-to crowd.

#2. That a publicity surge will likely increase your advertising and subscription revenues is an obvious inference the reader can draw from the statistics you quote, even if you intended to leave a different impression. As to whether you, who are presumably responsible for increasing COSMOS' advertising and subscription revenues through your editorial decisions, also recognize this consequence I also leave to readers to judge even if you are not willing to admit that you are actually doing the job of an editor of a

subscription-and-advertising based magazine. You've done your job well, why not be straightforwardly proud of it?

3. This context is not very relevant here -- on the list the charge was made that what you were doing was a publicity stunt and you agreed that it was a "stunt".

Anyway, it is uproariously funny to hear a journalist complaining about being quoted out of context. Thanks for the belly laugh. :-)

10:30 PM

nick said...

P.S. Wilson, which messages did you reject as "inappropriate" and why? Inquiring minds want to know.

10:50 PM

Anonymous said...

Thanks for your quick reply, Nick. And thanks for recognising the incorrect attribution in #1.

2. Yes, I am delighted with the attention the project brought to COSMOS - that is one of the reasons I was able to justify our involvement.

Your juxtaposition sought to imply that this was the primary reason we initiated the project: that's incorrect. We're all fans of science at COSMOS and do a lot of volunteer work that leads to no commercial benefit - as individuals and as a company. We proposed it because we thought it would be cool. Another company was actually slated to build it for the government: when they pulled out at the last minute, we offered to build and manage the project.

3. This is indeed relevant: if you're going to be fair, you quote people in context. "He told a Senate hearing" is different from "he told friends at a bar".

Equally, "He told a SETI discussion list" is different from "he told a news conference". By giving context, you allow readers to make up their minds. By not giving context, you create your own impression. Which may well serve your ends, I don't know.

You may find "uproariously funny to hear a journalist complaining about being quoted out of context". But that's what young journalists are counseled not to do, that what professional journalists try to avoid, and that's what hack columnists pushing a particular barrow love to do.

Wilson da Silva
Editor of COSMOS, creator of HELLO FROM EARTH

11:02 PM

Anonymous said...

P.S. Wilson, which messages did you reject as "inappropriate" and why? Inquiring minds want to know.

Firstly, the messages were in English as they were being pre-moderated by me and my editorial staff before publication on the site and before being accepted for transmission. So we had to be able to read them in order top determine if they were appropriate.

This was a requirement by the Australian government and NASA, neither of whom wanted to be involved in the publication and transmission of profanity, slurs, belligerence or otherwise inappropriate comments. We used normal editorial judgement, ie. what would be acceptable for publication in the letters section of a metropolitan daily newspaper.

Comments we deemed inappropriate included those we regraded as belligerent, offensive, insulting, racist, sexist, libelous, in bad taste or that we consider denigration, denunciation, vilification or political point-scoring against a single individual or a group of people.

Wilson da Silva
Editor of COSMOS, creator of HELLO FROM EARTH

11:08 PM

nick said...

Wilson, thanks again for your answers. I find these criteria for "inappropriate" messages to the heavens very interesting, and especially the role of U.S. and Australian government agencies in establishing criteria for these communications. It sounds like your criteria took into account only the reaction of your fellow humans, and not the possible reactions of the putative ETIs. Not that I think this is wrong -- I believe that it's impossible for any of us to predict the reactions of a completely alien, not to mention probably nonexistant, culture to any particular content. But there are plenty of people in SETI who think they can guess this better than the rest of us, and possibly NASA thinks so too, so I find the issue fascinating.

"This was a requirement by the Australian government and NASA, neither of whom wanted to be involved in the publication and transmission of profanity, slurs, belligerence or otherwise inappropriate comments."

They apparently either didn't realize or didn't mind that using government resources to send prayers to aliens in the first place might be considered offensive.

I presume there are specific documents from the Australian government and NASA that laid out these criteria? Since these criteria are an issue of public policy, can you publish these documents, or at least quote the relevant sections from them?

I am also interested in the financing of this venture. Did COSMOS or other private organizations pay full rates for the DSN time, or was this time provided free or at subsidized rates by the U.S. and/or Australian governments?

12:54 AM

Daniel A. Nagy said...

Again, I think that any activities directed at finding or talking to ETI are extremely premature before we solve some more fundamental problems like life. At this time, I think we do have a fairly good definition of life: any material system capable of non-trivial self-reproduction (I omit explaining what I mean by "non-trivial" for the sake of conciseness). As such, life can exist on a huge variety of timescales and we are probably better off restricting ourselves to timescales that we can deal with.

By contrast, we are more or less in the dark when it comes to "intelligence". It is usually described by the ability to collect, process and disseminate information (especially about beneficial behavioral patterns) in ways that last more than the lifetime of an individual, yet is not genetic (i.e. does not strictly follow self-reproduction inheritance).

There have been recent discoveries of spectacular failures at recognizing this kind of intelligence in our own environment. It took several decades of ethological research to find out why the behavior of captive animals (mammals in particular) differs so radically from their wild cousins and why re-introduction into the wild almost always fails: turns out that many of the essential behavioral patterns of mammals are not genetic and not learned from experience but learned from their peers and elders; most wild mammals have some (proto-)culture, which is essential to their survival in their natural habitat. Individual specimen that have not been brought up into this "culture", even if they start out better fed and more healthy, are much less likely to survive and if they do, they still behave very differently from the wild ones.

Even in archeology, how often we mis-interpret what we find! We are barely capable of recognizing and understanding intelligence that is very close to ours. Heck, we very often mis-read the purpose of contemporary human technology and social norms that we

didn't grow up with (the ones we call "foreign").

So, in short, I think that our understanding of the very concept of "intelligence" is so poor, that almost anything we estimate and postulate about ETI is so bad that it is probably not even wrong. And almost all the effort going into ETI research is wasted, before we learn more about more fundamental things like life.

5:01 PM

Daniel A. Nagy said...

Nick, you are being overly diplomatic here. I am sure you can recognize a standard democratic vote-buying operation when you see one. :-)

5:04 PM

nick said...

Daniel, I don't much disagree with your observations. I'd add that the Drake Equation combines many layers of such speculations and ignorance into one whopping specemin of Bayesiology. These wild guesses usually end up based on wish rather than observation. I'd also note that distinguishing artificial from natural is usually far easier than further examination of discovered culture which you rightly observe to be generally a very difficult task.

8:29 PM

Mitchell said...

Nick, I think it's a bit ironic that here you are chiding this exercise in pop CETI for catering to the public's naive ideas about life in the universe, or whatever, when you yourself blithely assert that >1 billion years is a "reasonable" expectation for the lifespan of a cosmic lineage of intelligences - on the basis of a sample of size 1, whose sole member hasn't even lasted *one millionth* of that duration since the moment you identify as the turning point (invention of printing).

Even if we presume to know enough about astrophysics and cosmology to think that there are no natural extinction threats facing a galactic civilization on such timescales, we are still extremely ignorant about the frequency of "threats from within", e.g. in the form of war and anti-survival ideas. And above all - going back to our sample of 1 - we have no idea how risky our own situation still is. A large portion of Robin's Great Filter may still lie ahead of us.

9:26 PM

nick said...

Mitchell, the idea that _any_ of Robin's Great Filter, even the tiniest fraction of a percent, lies ahead of us stems from a prime example of Bayesiology. It's intuitively appealing, but pure fallacy, to suppose that in a state of ignorance we deem more probable that we are somewhere in the middle of a putative distribution rather that at in a different phase where the distribution doesn't apply. To treat it all as one statistical distribution is pure Bayesiological superstition. We must look to actual evidence in the real world, not to Bayesiological "reasoning" about the the Drake Equation, to determine the likelihood of existential threats and other Drake factors.

Several of the Drake factors are almost pure speculation, so that nothing useful can be derived _from_ calculating that equation. There's no significant information to indicate that _any_ of the Great Filter lies ahead of us, and much to indicate that it lies behind us.

We can observe much about existential risk, the probability of various stages of life, and so on and we must focus on those realities to make headway. Your comment about "a sample of size 1", when we have vast complex biological and human histories to look to,

suggests a basic approach that is Bayesiological rather than empirical.

My estimate of >1 billion years comes from long thinking about real threats that have been purported to be existential (nuclear war, plague, nanotech, AI, and so on) and the (generally quite poor) reasoning that goes into such claims. Very consistently the existential threats of these things have been grossly exaggerated by popular culture, throwing popular intuitions very far off the mark. Instead of handwaving, why don't you actually propose an existential threat and let's analyze it?

My estimate also comes from some basic reasoning about technological possibilities -- for example, the high probability of space colonization some time in the next 500 years, so that there is cosmologically only the tiniest slit of a window where we wield extensive technological power with all of us trapped with it on a single planet. Now, to understand this obviously requires far more than waving around intuitively plausible probabilities like some Bayesiologist, it requires that one must do some extensive thinking about space colonization, which I've done (I'm happy to supply links).

Finally, our lack of observation of any artificial surfaces in the universe also gives a decent estimate of what the _answer_ to the Drake Equation should be, namely very small (probably much less than 1 civilization per galaxy). That is far more accurate than trying to calculate the answer to the Drake equation, because so many of the factors, such as the probability of the origin of life, the probability of going through various phases in the evolution of life, and so on are so highly uncertain.

I'd also point out that your theories don't help SETI or METI/CETI much: if civilizations have such short lifetimes, or short windows in which we detect their radio, then the probability that they exist and can communicate at the same time as us is correspondingly lowered. (Another possible implication of short window where we can detect them is that they are trying to hide -- which strongly suggests that not learning from them and hiding ourselves, but rather using METI etc. to "shout to the cosmos", could as David Brin argues be extremely dangerous. In which case METI deserves far more condemnation than just being laughed at).

11:14 PM

Daniel A. Nagy said...

Is an anthill artificial? Is an ant artificial? How about a planet-sized ant-hill or planet-sized ant?

I am not at all sure that we can tell a product of evolution from intelligent design without a good definition of intelligent design.

And even trivial self-reproduction (e.g. crystal growth) can produce some very artificial-looking results.

Self-reproduction is one of the very few forces in the Universe that locally reduce entropy. Unusually low-entropy arrangements may hint at some self-reproduction at work, but to discern whether it is trivial, non-trivial or intelligent may be tough. Especially, if we don't know what intelligent really means and how (generalized) life really works.

1:38 AM

Mitchell said...

My basic view is very simple. You are like a Copernican in the Middle Ages, scoffing at the geocentric thinking of the common people, and talking with your heliocentrist peers about how God obviously made the solar system in the form of nested platonic solids. There are elements in your thought which put you way ahead of popular exobiology, but any positive alternative you propose is bound to be seriously wrong because there are too many unknown unknowns.

Perhaps I brought Bayes into it by talking about priors, but I don't say we're still traversing Robin's Filter for any "Bayesiological" reason. If you want a concrete near-future threat - I would think Robert Freitas's aerovores have an excellent chance of killing us all. The same goes for automated nanowar, as in Lem's "Fiasco". But we also do not know what the cosmic distribution of values in naturally evolved tool-using intelligences is, nor do we know the frequency with which civilizations which attain to space travel choose radically expansionist trajectories. We don't know what the dark matter is; perhaps all the life of the universe is taking place there. Etc.

I do admit to being influenced by a type of quasi-anthropic reasoning. The fact that I find myself to be only a mildly augmented natural replicator, rather than a wholly artificial one in a society with a hundred-million-year history, might be taken as evidence that societies like the latter are rare enough in the universe that the former sort predominates. But dialectical quibbling over the assumptions behind such reasoning will again reveal that the real situation is simply one of ignorance. We do not *know* and we are not yet, and may never be, in a position to rationally estimate such things. The only form of rationality available here is to entertain scenarios which are internally consistent and consistent with what we do know. But we are not in a position to rationally favor one class of such scenarios over another.

1:56 AM

nick said...

Daniel, an anthill or almost any other designed or evolved thing is very easy to distinguish from geological formation, unless it was specifically designed or evolved to hide. An anthill for example has an eerie uniformity of grain sizes, is oddly smooth compared to normal eroded dirt, has holes, and has ants crawling over it. (That's just recalling my memory of playing with anthills as a kid -- I suspect there are probably also rare molecules in those grains that one could see in spectral lines).

Before worrying about distinguishing evolved from designed, first we need to discover something that might be evolved _or_ designed. But no astronomical phenomenon shows any signs of adaptation, whether evolved or designed.

For example, we'd expect merely "geological" (unadapted) star systems in a region to be as they in fact appear: white hot stars wasting all their energy, planets wasting most of their mass far from the surface, and so on. But we'd expect adapted star systems to glow in the infrared, acting like radiators for heat engines as the observe side efficiently harnesses the light of its star. Dyson shells would cover the galaxy's stars like plants cover the lands of our planet. Dyson shell forests would obscure our view of stars like leaves shade a hiker in a forest.

An adapted galaxy would look radically different from the galaxies we observe: it would primarily radiate in and below the infrared, due to adapted surfaces rather than dust clouds. The Adapted surfaces that would dominate our view of these galaxies would have very unique optical spectra (which astronomers can measure) reflecting molecular structures that are very rare outside adapted entities like leaves (e.g. chlorphyll) or solar panels (e.g. crystalline silicon). Chlorophyll and crystalline silicon in significant quantities don't exist outside adapted structures. The same goes for the surfaces (or more precisely visible portions) of other adapted structures -- they typically contain molecular structures highly adapted to surface use (most often for their optical properties) that are very rare to nonexistant in unadapted nature. The more advanced or well-adapted the surface, the more likely this is to be true. Adaptation whether evolved or designed sticks out like a sore thumb against the merely "geological" unadapted nature, but the cosmos we observe (astronomers can see hundreds of billions of galaxies) looks quite "geological" -- in all the vast computer disks worth of astronomical data nothing adapted has ever been recognized.

3:59 AM

Daniel A. Nagy said...

"Inevitability" by Victor Argonov's band "Complex Numbers":
http://www.youtube.com/watch?v=HtfqEHAf9Pc

1:22 AM

Daniel A. Nagy said...

Sorry that was a half-baked beta. Here is the final version in Russian:
http://www.youtube.com/watch?v=FMJNta-okRw
And the same in French:
http://www.youtube.com/watch?v=DynLBcmOTGs

"Inevitability" by Victor Argonov and his band "Complex Numbers".

1:47 AM

Anonymous said...

Nick:

You might like Peter Watt's Blindsight (a non-typical first contact story). A bit of a mixed bag but has some interesting ideas in it.

The first-contact aliens prove to be hostile. It's theorized that they assumed we were hostile at them b/c our radio transmissions were the equivalent of spam: having the semblance of intelligent construction but without any useful content (eg: billions of cellphone calls talking about nothing); the interstellar equivalent of an attractive nuisance.

The book does in fact end with a systemwide clampdown on EM transmission to avoid attracting further attention.

2:03 PM

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